

VIII. ADOPTION AND OPERATION OF HIGH-INVOLVEMENT WORK SYSTEMS

Workplace Innovation and Union Status: Synergy or Strife?

Anil Verma
University of Toronto

Tony Fang
Statistics Canada

Abstract

In this study, we investigate union/nonunion differences in product and process innovations. The analysis focuses on the ability of workplaces to innovate and its relationship to union status and to the introduction of innovative workplace practices using data from the first Workplace and Employee Survey (WES). Two effects were hypothesized: a direct negative effect of unions in the form of restrictive work rules and an indirect positive effect through adoption of innovative workplace practices. Results show that the presence or absence of a union in itself appears unrelated to the ability of workplaces to innovate. On the other hand, several work practices such as use of teams, flexible management, and use of training were positively and significantly related to most measures of innovation. Other much touted practices such as incentives appeared to have little effect. Flexible hours and use of new technology had positive effects on some measures but not others.

Introduction

In the post-1950 period in North America, a great deal of interest has been focused on the impact of unions on the workplace. Researchers and practitioners alike were interested in knowing what impact, if any, do unions have

Author's address: University of Toronto, Centre for Industrial Relations, 121 George Street, Toronto, ON, M5S 2E8, Canada

on the workplace. Freeman and Medoff's 1984 book *What Do Unions Do?* put this topic in focus by presenting original research and summarizing previous evidence of union impact on a range of workplace outcomes such as wages, benefits, turnover, and productivity. Although some of the effects such as union wage premiums and union tendency to reduce turnover are well known and documented (Freeman and Medoff 1981), relatively less is known about the effect union status of a workplace may have had on the ability to introduce innovations during the 1990s, a period of extensive restructuring in Canadian workplaces.

According to the theory of competitive advantage (Porter 1980) businesses must innovate in order to stay competitive. These innovations can be in products, but also in processes. Without such innovations, a business cannot distinguish its products from others. Thus, product or process innovations remain at the heart of business success in the contemporary marketplace. Meanwhile workplace changes have occurred in nonwage workplace practices such as flexibility, employee involvement, and technology adoption (Kochan and Osterman 1994). These developments lead to the question of whether introducing workplace practices helps make a workplace more innovative.

In this study, we investigate union/nonunion differences in product and process innovations. The analysis then examines whether the ability to innovate may be related to union status and to the introduction of innovative workplace practices using data from the first Workplace and Employee Survey (WES).

Conceptual Framework

There are two potential links between union status of a workplace and its ability to innovate. The first link can be found in the historical trend in collective bargaining of rules that restrict management flexibility. Among other examples, rules such as "featherbedding" (i.e., higher employment than needed), restrictions on merit pay, and part-time or contract employment have been documented in numerous case studies (Verma 1984). One may expect that restrictive work rules are likely to reduce the ability of an organization to innovate. Thus, all else being equal, we would expect union workplaces to report fewer product and process innovations than nonunion workplaces.

In another stream of research Brown and Medoff (1978) and Clark (1980), among others, have reported higher productivity in unionized plants relative to comparable nonunion plants. A central explanation for these outcomes lies around the "shock effect," which holds that unions shock management into efficiency by forcing a degree of formalization in management processes (Slichter 1941; Slichter et al. 1960). Most studies published after Freeman and

Medoff's 1984 book are essentially supportive of the pattern of differences documented in that work.

The shock effect can be used to explain the observed fact that union workplaces generally report a higher level of innovative workplace practices such as flexible work organization and training. The presence of unions "shocks" management into adopting flexibility, training, and other practices. Flexible practices, in turn, can be hypothesized to enhance an organization's ability to introduce product or process innovations. In this way, unions would have a positive effect on an organization's ability to introduce product or process innovations.

In practice, the two effects described above would overlap and to some extent cancel each other out. The question of which effect would dominate is an empirical one that this paper investigates with the help of a unique dataset.

Data and Methods

The WES, first conducted in 1999, offers us a chance to examine the effect of workplace characteristics, in addition to the industry and firm size effects, on innovation across union and nonunion workplaces. The sample used in this analysis is based on responses from 6,322 workplaces in 1999 (Table 1). Of these workplaces, 1,877 (or nearly 30 percent) had some of their production workers unionized. Unionized workplaces were generally larger both in employment (72 vs. 10) and in sales revenue. Unionized workplaces were also more likely to be foreign owned and to be in the not-for-profit sector.

Appendix 1 shows the five questions from WES used to construct six innovation variables. The first four questions deal with whether products (goods and services) were introduced or improved and whether processes were introduced or improved. These five questions were combined in the following ways (see Appendix 2). First, the variable *Product Innovation Index* combines questions 1 and 2. Similarly, *Process Innovation Index* combines questions 3 and 4. Next, we combine the two questions on products, introduction, or improvement (1 and 3), and the two questions on processes (2 and 4). *Innovation Scope* is used once by itself and another time in conjunction with the other variables to form the overall innovation index. To construct the innovation index, we first constructed an innovation composite using questions 1–4. We assumed that an introduction of products or processes (questions 1 and 3) was worth more (2 points) than improvements (questions 2 and 4; worth 1 point). If no introductions or improvements were reported, the score was set to zero. This index on a 0–2 scale was then multiplied by *Innovation Scope* (0–3 scale) to obtain the innovation index.

TABLE 1
Workplace Profile by Union Status

	All Workplaces (<i>n</i> = 6,322)	Unionized (<i>n</i> = 1,877)	Nonunion (<i>n</i> = 4,455)	Union/ Nonunion Difference Significant at $p \leq .05$?
Average employment	15	72	10	Yes
Full-time, permanent employees	11	50	7	Yes
Total revenue ('000)	2,593.0	11,380.3	1,942.7	Yes
Gross payroll ('000)	465.6	2481.3	301.5	Yes
Foreign ownership (%)	6.8	12.2	6.4	Yes
Nonprofit organization (%)	8.8	16.6	8.2	Yes
Teams (%)	7.1	21.1	6.0	Yes
Individual incentives (%)	29.8	23.6	30.3	Yes
Group incentives (%)	12.4	11.2	12.5	No
Other incentives (%)	16.4	17.2	16.3	No
Nonincentives (%)	61.5	64.6	61.3	Yes
Formal grievance procedure (%)	10.7	59.9	6.7	Yes
Computer users (%)	46.5	39.5	47.1	Yes
Flexible management (%)	32.8	41.3	32.1	Yes
Flexible hours (%)	24.7	23.3	24.9	No
Flexible employment (%)	13.5	27.8	12.4	Yes
Training provided (%)	54.1	69.5	52.8	Yes
Product innovation index (0–1 scale)	0.138	0.185	0.135	No
Process innovation index (0–1 scale)	0.141	0.200	0.136	No
New innovation (0–1 scale)	0.387	0.436	0.383	No
Improvement innovation (0–1 scale)	0.421	0.534	0.411	Yes
Innovation scope (0–3 scale)	0.158	0.217	0.153	No
Innovation index (0–6 scale)	0.175	0.234	0.170	No

Notes: All results are weighted by population weights. Total population size = 718,083; unionized population = 54,053; nonunion population = 664,030. Unionized workplaces are defined as those with at least one union present at the workplace.

Results

The results are discussed in three sections. First we discuss the pattern of differences between unionized and nonunion workplaces in workplace practices. This is followed by a discussion of differences in their ability to introduce innovations in products or processes. Last, results from a set of multivariate analyses of innovation are reported.

Differences in Workplace Practices

As Table 1 shows, unionized workplaces reported a higher incidence of a variety of employee involvement and flexible workplace practices. Unionized

workplaces were more likely to report use of teams, formal grievance procedures, flexible management practices, flexible employment, and training. Nonunion workplaces reported a higher incidence of individual incentives and computer usage. In three areas—use of group incentives, other incentives, and flexible hours—there was no significant difference between the two groups. These results are consistent with previous findings.

Product and Process Innovation

The average score on each of the six constructed innovation variables is shown in the bottom panel of Table 1. There were no significant differences between unionized and nonunion workplaces on five of the six measures of innovation, but the signs were all in favor of the unionized workplaces. On one measure, improvements in products and/or processes, the mean score was significantly higher for unionized workplaces. One may conclude from this that, at first examination (without controlling for other characteristics), there does not appear to be a great difference in the ability of unionized and nonunion workplaces to innovate. The edge goes to unionized workplaces, which report a higher incidence on all the variables, with one of them (improvements in products or processes) being significantly higher compared to nonunion workplaces.

Regression Results

In the final stage of the analysis, we regressed each of the six innovation variables on union status, industry, region, size, and workplace practices. Later, interactions between the union status variable and workplace practices were added to investigate the joint effect of being unionized and use of these workplace practices. Only the final regressions are reported in Table 2. The union status variable in the regressions was a continuous variable constructed by dividing the number of unionized employees by the total number of employees.

As shown in Table 2, the fraction of employees unionized was not significant in any of the regressions. The sign was positive in two regressions and negative in the other four. It is best to conclude from these results that the union status of workers in the workplace appears to have no impact on a workplace's ability to introduce innovations. Use of incentives, a highly touted workplace practice in recent years, also appeared to have little impact on the ability to innovate. Individual incentive had a positive and significant impact on only one of the six measures, *Improvement Innovation*. Similarly, *Group Incentives* was positive and significant for new innovation.

The most consistent results were obtained for use of teams, flexible management practices, and training. In almost all these cases, the use of these practices significantly increased the ability of workplaces to introduce a vari-

TABLE 2
OLS Regression Results on Six Measures of Innovation

Dependent Variable	Product		Process			Improvement Innovation (4)	Innovation Scope (5)	Innovation Index (6)
	Innovation Index (1)	Innovation Index (2)	New Innovation (3)	Innovation Index (2)	Innovation Index (6)			
% Union	-0.033 (0.048)	-0.011 (0.051)	0.024 (0.155)	0.127 (0.159)	-0.011 (0.053)	-0.011 (0.053)	-0.011 (0.059)	
Individual incentives	0.035 (0.033)	0.047 (0.033)	0.051 (0.033)	0.070 (0.033)**	0.046 (0.034)	0.046 (0.038)	0.044 (0.038)	
Group incentives	-0.033 (0.045)	-0.037 (0.045)	0.107 (0.042)**	0.046 (0.042)	-0.027 (0.046)	-0.016 (0.050)	-0.016 (0.050)	
Other incentives	0.064 (0.050)	0.044 (0.050)	0.035 (0.037)	0.047 (0.038)	0.033 (0.050)	0.021 (0.052)	0.021 (0.052)	
Foreign ownership	0.062 (0.057)	0.100 (0.059)	0.060 (0.051)	0.012 (0.040)	0.085 (0.059)	0.072 (0.060)	0.072 (0.060)	
Nonprofit sector	-0.022 (0.027)	-0.053 (0.023)**	0.018 (0.038)	-0.012 (0.038)	-0.040 (0.028)	-0.028 (0.039)	-0.028 (0.039)	
Teams	0.136 (0.069)**	0.142 (0.070)**	0.154 (0.047)***	0.118 (0.051)**	0.143 (0.072)**	0.143 (0.079)*	0.143 (0.079)*	
Grievance procedure	0.049 (0.059)	0.026 (0.059)	-0.045 (0.048)	0.002 (0.054)	0.037 (0.059)	0.047 (0.065)	0.047 (0.065)	
Flexible management	0.121 (0.040)**	0.146 (0.040)***	0.244 (0.040)***	0.259 (0.041)***	0.132 (0.041)***	0.118 (0.043)***	0.118 (0.043)***	
Flexible hours	0.008 (0.040)	0.005 (0.040)	0.108 (0.039)***	0.136 (0.040)***	0.018 (0.041)	0.030 (0.044)	0.030 (0.044)	
Flexible employment	-0.007 (0.052)	-0.017 (0.052)	-0.029 (0.047)	-0.070 (0.048)	-0.019 (0.053)	-0.020 (0.056)	-0.020 (0.056)	

Dependent Variable	Product Innovation Index (1)	Process Innovation Index (2)	New Innovation (3)	Improvement Innovation (4)	Innovation Scope (5)	Innovation Index (6)
Training	0.044 (0.022)**	0.033 (0.022)	0.078 (0.032)**	0.080 (0.033)**	0.050 (0.024)**	0.066 (0.029)**
Use of new technology	0.001 (0.000)**	0.001 (0.000)*	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)**	0.001 (0.000)**
U*Teams	-0.105 (0.122)	-0.030 (0.133)	-0.302 (0.109)	-0.020 (0.099)	-0.028 (0.133)	-0.027 (0.139)
U*Grievance procedure	-0.162 (0.123)	-0.022 (0.124)	0.014 (0.141)	0.008 (0.128)	-0.066 (0.127)	-0.110 (0.139)
U*Flexible management	0.157 (0.107)	0.147 (0.110)	0.063 (0.125)	0.018 (0.120)	0.160 (0.112)	0.172 (0.116)
U*Flexible hours	-0.102 (0.097)	-0.008 (0.105)	-0.202 (0.112)	-0.077 (0.104)	-0.029 (0.107)	-0.050 (0.110)
U*Flexible employment	-0.084 (0.107)	-0.116 (0.109)	0.038 (0.129)	-0.126 (0.124)	-0.122 (0.110)	-0.128 (0.115)
U*Training	0.054 (0.103)	-0.093 (0.117)	0.031 (0.159)	-0.077 (0.142)	-0.078 (0.121)	-0.063 (0.135)
U*Use of new technology	0.002 (0.001)	0.002 (0.001)	0.002 (0.002)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)
R ²	0.082	0.090	0.197	0.213	0.089	0.075

Notes: All regression models significant at $p < .001$ level. All regressions use weighted data. Population size = weighted sample size = 718,083. All regressions include controls for industry (14 categories), region (6 categories), and size in terms of employment (4 categories).

ety of innovations. Somewhat less consistent results were obtained for use of flexible hours (significant in two regressions) and use of new technology (significant in three regressions). We may conclude from these results that the use of certain workplace practices enhances the ability to innovate.

Next, we introduced interactions between the fraction unionized and each of the workplace practices. None of these interaction terms is significant. These results suggest that the presence or absence of a union does not necessarily contribute to the ability to innovate. Taken together with the results on the main effects of union status and workplace practices, it suggests that union impact on innovation is fully captured in the workplace practices themselves.

Discussion and Conclusions

Although there has been much speculation about the effect of unions on innovation, there has been limited evidence of this relationship. The WES data set provides us with a large sample of workplaces on a nationally representative scale. Two effects were hypothesized: a direct negative effect of unions in the form of restrictive work rules and an indirect positive effect through adoption of innovative workplace practices. The results show that the presence or absence of a union in itself appears unrelated to the ability of workplaces to innovate. On the other hand, several work practices, such as use of teams, flexible management, and training, were positively and significantly related to most measures of innovation. Other much-touted practices such as incentives appeared to have little effect. Flexible hours and use of new technology had positive effects on some measures, but not others.

These results suggest that linking unions to an organization's ability to innovate either positively or negatively is unwarranted. Although there is no direct relationship, there may be an indirect positive impact of unions on organizational ability to innovate. This effect works through the adoption of certain workplace practices. Not all unionized workplaces adopt such practices. This is equally true of nonunion workplaces. The ability to innovate in products and processes appears related to these innovative workplace practices rather than to union status. These results suggest that managers, unions, and workers ought to focus on workplace practices rather than union status if they wish to compete through innovations.

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APPENDIX 1

WES Questions Used to Construct the Innovation Variables

Q1: Introduced new goods or services (i.e., products)	0 No 1 Yes	Between April 1 last year and March 31 this year, has this workplace introduced new goods and services? <i>New goods and services differ significantly in character or intended use from previously produced goods or services.</i>
Q2: Improved goods or services (i.e., products)	0 No 1 Yes	Between April 1 last year and March 31 this year, has this workplace introduced improved goods or services? <i>Improved goods or services are those whose performance has been significantly enhanced or upgraded.</i>
Q3: Introduced new processes	0 No 1 Yes	Between April 1 last year and March 31 this year, has this workplace introduced new processes? <i>New processes included the adoption of new methods of goods production or service delivery</i>
Q4: Improved processes	0 No 1 Yes	Between April 1 last year and March 31 this year, has this workplace introduced improved processes? <i>Improved processes are those whose performance has been significantly enhanced or upgraded.</i>
Q5: Innovation scope:	3 a world first 2 a Canadian first 1 a first in the local market 0 none	Was this innovation, a world first, a Canadian first, a local first, or none of the above?

APPENDIX 2

Construction of Innovation Variables

Innovation Variable	Survey Questions Used to Construct Variable	Method	Resulting Scale
Innovation Index	Q1–Q5	Innovation scope × innovation (2 for new innovation; 1 for improved innovation; 0 otherwise)	0–6
Product Innovation Index	Q1 and Q2	1 if Q1 or Q2 is 1; 0 otherwise	0–1
Process Innovation Index	Q3 and Q4	1 if Q3 or Q4 is 1; 0 otherwise	0–1
Innovation Scope	Q5	—	0–3
New Innovation	Q1 and Q3	1 if Q1 or Q3 is 1; 0 otherwise	0–1
Improved Innovation	Q2 and Q4	1 if Q2 or Q4 is 1; 0 otherwise	0–1